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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.        | CONFIRMATION NO. |
|--|-------------|----------------------|----------------------------|------------------|
| 10/776,901   | 02/10/2004  | Fook-Luen Heng       | END920030090US1<br>(16992) | 3048             |
| 23389  | 7590        | 09/20/2006           | EXAMINER                   |                  |
| SCULLY SCOTT MURPHY & PRESSER, PC<br>400 GARDEN CITY PLAZA<br>SUITE 300<br>GARDEN CITY, NY 11530 |             |                      | DOAN, NGHIA M              |                  |
|  |             |                      | ART UNIT                   | PAPER NUMBER     |
|  |             |                      | 2825                       |                  |

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/776,901 | <b>Applicant(s)</b><br>HENG ET AL. |  |
|                              | <b>Examiner</b><br>Nghia M. Doan     | <b>Art Unit</b><br>2825            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-11 and 13-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-11 and 13-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This is a response to the communication filed on 02/10/2004 and Applicant Amended filed on 09/07/2006. Claims 1, 3-6, 8-11, and 13-15 are pending.

Claims 1, 6, and 11 have been amended.

Claims 2, 7, and 12 have been canceled.

### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to because the abstract is less than 50 words. Correction is required. See MPEP § 608.01(b).

### ***Claim Objections***

4. Claims 1, 4, 6, 9, 11, and 14 are objected to because of the following informalities:

Claim 1 recites the limitation "the model region" and "the intensity of images projected" in line 5 and 10, respectively. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "the variation of image intensity" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 6 recites the limitation "the model region" and "the intensity of images projected" in line 5 and 10, respectively. There is insufficient antecedent basis for this limitation in the claim.

Claim 9 recites the limitation "the variation of image intensity" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "the model region" and "the intensity of images projected" in line 6 and 11, respectively. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "the variation of image intensity" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Granik et al. (US Patent No. 6,928,634).

7. With respect to claims 1, 6, and 11, Granik et al. disclose a method (claim 1), a system (claim 6), and a method executed by a computer (claim 11), respectively, for

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lithographic process window optimization of an integrated circuit layout on a wafer and of superimposable masks and mask levels for fabrication of the integrated circuit layouts that are illuminated by beams of light radiation from a range of directions, said method comprising:

specifying a preliminary set of printed circuit feature edge locations ( abstract, Fig. 1A; col. 1, ll. 38 to col. 2, ll. 7; Fig. 5, step 122, col. 5, ll. 46-60), the model region at each edge location is recentered upon the printed edge of said circuit layout reaching the exterior of said model region (the Abstract, col. 1, ll. 39-48; Fig. 3A, col. 3, ll. 56 to col. 4, ll. 54);

specifying a set of linked constraints on allowable positions for the edges of said circuit features (abstract; col. 1, ll. 38 to col. 2, ll. 7; Figs. 3A-3B; col. 3, ll. 56 to col. 5, ll. 12);

initially centering trust regions at the preliminary locations of said circuit feature edges ( Fig. 3A, col. 3, ll. 56 to col. 4, ll. 54; col. 5, ll. 32-44);

computing models of the intensity of images projected within said trust region (Fig. 1A, col. 1, ll. 49 to col. 2, ll. 38; Fig. 3A, col. 3, ll. 56 to col. 4, ll. 54 ); and

adjusting shapes provided on said masks and intensities of said light beams illuminating the masks to project images on the wafer which satisfy the linked set of constraints over as wide a range of exposures as possible based on the computing models (Fig. 3A, col. 3, ll. 56 to col. 4, ll. 54).

8. With respect to claims 3, 8, and 13, Granik et al. disclose a method/ a system/ a method executed by a computer as claimed in claims 1, 6, and 11, respectively, wherein

said integrated circuit features are simultaneously optimized on a plurality of mask levels through the linked involvement of a plurality of circuit feature edges (abstract; col. 2, ll. 51-61; Figs. 4-6A and 6B; col. 5, ll. 13 to col. 8, ll. 8).

9. With respect to claims 4, 9, and 14, Granik et al. disclose a method/a system/ a method executed by a computer as claimed in claims 1, 6, and 13, respectively, wherein said allowable positions of said edges are shiftable within a range in which the variation of image intensity at the image sidewalls is approximately linear ("image slope") or quadratic in nature (Fig. 1B; col. 1, ll. 56 to col. 2, ll. 7).

10. With respect to claims 5, 10, and 15, Granik et al. disclose a method/ a system/ a method executed by a computer as claimed in claims 4, 9, and 14, respectively, wherein said allowable shifts in the edges are implemented in parallel with trust region constraints on edge positions to effect said circuit layout optimization (abstract; col. 2, ll. 51-61; Figs. 4-6A and 6B; col. 5 ll. 13 to col. col. 8, ll. 8).

#### ***Examiner Remarks***

11. In the Applicant Argument, Applicant states "Granik et al. does not clearly provide for such as a method of calculating of image intensities".

12. Examiner respectfully disagree as the followings:

Granik et al. states "measurements of the predicted image slope, maximum and minimum intensities are calculated as shown in Fig. 1B" (col. 1, line 56-67), which clearly shown the measuring and calculating are existed.

13. Claim 1 has been amended by incorporated the limitation cited in claim 2 into claim 1 and similarly to the other independent claims 6 and 11, but Granik's reference

read on all the limitation have been cited. Applicant is invited to review claim rejection above.

14. Applicant's arguments filed 09/07/2006 have been fully considered but they are not persuasive. Therefore, the claim rejection in the last office action mailed on 06/08/2006 is maintained.

***Conclusion***

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nghia M. Doan whose telephone number is 571-272-5973. The examiner can normally be reached on 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nghia M. Doan  
Patent Examiner  
AU 2825  
NMD

PAUL DINH  
PRIMARY EXAMINER

A handwritten signature in black ink that reads "Paul Dinh". The signature is written in a cursive style with a long, sweeping horizontal line extending to the right.